8. (Previously presented) A method according to claim 6, further including the step of applying said extracted analyte to a GC capillary column.

9. (Previously presented) A method according to claim 6, further including the step of directing said extracted analyte to a liquid phase separation system.

10. (Previously presented) A method according to claim 1, further including the step of preconditioning sol-gel extraction medium prior to said exposing step.

11. (Previously presented) A method according to claim 10, wherein said preconditioning step comprises heating and purging an inert gas over sol-gel extraction medium.

REMARKS

Assignee's executed Revocation of Power of Attorney and new Power of Attorney documents are attached hereto. Applicant has carefully studied the final Office's Action mailed July 21, 2003 and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

***Claim Rejections - 35 U.S.C. § 103***

Claims 1-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kataoka (Anal. Chem., 71:4237-4244 (October 1, 1999)) in view of Chong (Anal. Chem., 69:3889-3898 (1997)) and either Wang (Anal. Chem., 69:4566-4576 (1997)), or Malik (Advanced Sol-gel Column Technology for Condensed Phase Microseparations, pg. 54 (1997). The Office states that it would have been obvious to use sol-gel in Kataoka because Chong discloses that sol-gel chemistry allows low costs, has the unique ability to achieve molecular uniformity, and has a strong adhesion of the coating to the substrate and either because Wang discloses that sol-gel coated columns provide efficient separation for analytes from a wide polarity range and because of direct chemical bonding to fused silica substrates, sol-gel coatings possess significantly higher thermal stability than conventional coatings or because Malik discloses the advance features of



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sol-gel chemistry which can be applied in an open column and chemical bonding of the coating or the monolithic bed to the column walls provides enhanced operational stability to the sol-gel columns.

It is first noted that Dr. Malik is a co-author of all references cite above (Chong, Wang, and Malik), except for Kataoka. Before reviewing the cited art, Applicant will first briefly review the claimed invention as recited in presently amended claim 1. Amended claim 1 recites a method of preconcentrating trace analytes, comprising the steps of: processing a hollow capillary by hydrothermal treatment; filling the capillary with a sol-gel extraction medium, where the sol-gel extraction medium is chemically bound to inner walls of the hollow capillary to form a sol-gel extraction medium-loaded capillary; and exposing the loaded capillary to a sample containing at least one target analyte, where the target analyte becomes disposed inside the loaded capillary.

In the claimed method, the sol-gel extraction medium is chemically bound to inner walls of the hollow capillary to form a sol-gel extraction medium-loaded capillary. The step of hydrothermal treatment, prior to coating is disclosed by the Applicant in the detailed description on Page 22, Lines 20 – Page 23, Line 20, thus no new matter has been added by the amendment made herein.

Hydrothermal treatment of the capillary inner surface begins with treatment of the inner surface thereof with deionized water. This initial hydrothermal treatment is performed for several reasons. First, the water serves to clean the inner capillary surface, removing any contaminants originating from the capillary drawing process (e.g. 2,000°C) or postdrawing manipulation and handling. Moreover, this pretreatment with water enhances surface silanol concentrations, thereby offering a higher percentage of bonding sites for anchoring the sol-gel coating to the inner capillary surface.

Without the hydrothermal step, insufficient bonding sites are available to provide chemically immobilized (stable) sol-gel coatings on the capillary inner surface. As a result, coatings without the hydrothermal treatment step are prone to dislodging from the capillary surface. The tendency for the coatings to dislodge increases as the coating thickness increases. None of the cited references disclose a hydrothermal treatment step.

Relatively thick sol-gel coatings made possible by the hydrothermal treatment step are disclosed in the specification of the instant application as they lead to enhanced extraction



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sensitivity. Page 34, lines 15-25 of the detailed description of the Application state that the sol-gel coating technology can easily produce thick coatings. The use of micro-extraction capillaries with thick sol-gel coatings should lead to higher sensitivity of capillary microextraction.

The sol-gel loaded capillary is then exposed to a sample containing at least one target analyte, where the target analyte becomes disposed inside the hollow capillary. The invention provides unexpectedly high detection sensitivities. For example, according to page 42, lines 22-24, the invention provides parts per trillion (ppt) and parts per quadrillion (ppq) level detection sensitivities for both polar and non-polar analytes.

In view of the amendment made herein to independent claim 1, including the step of processing the hollow capillary by hydrothermal treatment, claim 1 now is not obvious in view of the cited references, particularly Kataoka, Chong, Wang, or Malik. None of these cited references disclose hydrothermal treatment prior to chemically binding the extraction medium to the inner walls. Specifically, none of the cited references, either standing alone, nor combined, teach a method of preconcentrating trace analytes, comprising the steps of: processing a hollow capillary by hydrothermal treatment; filling the capillary with a sol-gel extraction medium, where the sol-gel extraction medium is chemically bound to inner walls of the hollow capillary to form a sol-gel extraction medium-loaded capillary; and exposing the loaded capillary to a sample containing at least one target analyte, where the target analyte becomes disposed inside the loaded capillary. Claim 1, as amended is now in condition for allowance, thus, withdrawal of the rejection is respectfully requested.

Claims 2-11, dependent claims of claim 1, also stand rejected, over Kataoka in view of Chong, and Wang or Malik. Claims 2-11 carry the limitations of the independent claim from which they depend. Thus, each of the claims 2-11 have the limitation of processing the hollow capillary by hydrothermal treatment step. Withdrawal of dependent claims 2-11 is also respectfully requested, as newly amended claim 1 is now in condition for allowance.



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*Conclusion*

Entry of a Notice of Allowance is solicited. If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested.

Very respectfully,

SMITH & HOPEN

By: _____

Dated: January 21, 2004

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**CERTIFICATE OF FACSIMILE TRANSMISSION**
**(37 C.F.R. 1.8(a))**

I HEREBY CERTIFY that this Amendment A, including Amendments to the Claims and Remarks, is being transmitted by facsimile to the United States Patent and Trademark Office, Art Unit 1723, Attn: Ernest G. Therkorn, (703) 872-9311 on January 21, 2004.

Dated: January 21, 2004

_____
Deborah Preza



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